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OCT. - 1959
NUMBER 118

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EDITORIAL.

FAIR ENOUGH

The Minstry of Agriculture is showing a not inconsiderable interest in the whys and wherefors of the mushroom industry in general and it is now practically certain that all Grower Members of the MGA in the United Kingdom will shortly receive or have already received a simple questionnaire from the Ministry asking for details of total production.

For many years now we, as an industry, have clamoured for official recognition and repeatedly, representations on this and that have been made by this Association to the Ministry.

It is fair enough then that the Ministry now turn round with a request to the Association for close co-operation in the matter of ascertaining, once and for all, the present state of the industry in general and in particular as far as total production is concerned. That co-operation has been given by the Association and the request now going out to growers is the direct and the immediate result.

Only in the very recent past have two important representations been made to the Ministry by the MGA and through the NFU on matters of considerable interest to growers. The first concerned the £7½ million Grant Aid to Horticulture where, it appeared at one time, mushroom growers might be left out in the cold; the second is on the subject of fertilizer subsidies about which the Ministry has been asking some pertinent questions—and getting some pertinent replies. Success has already attended the effort made on the first count and satisfactory progress is being made on the matter of fertilizer subsidies.

What mushroom growers want from the Ministry is a square deal —no more and no less. What the Ministry is now asking growers is exactly the same—a square deal in the matter of information.

It is to be hoped therefore that the growers will co-operate to the fullest extent and enable the Ministry to obtain, once and for all, a clear overall production figure. Then, both the Ministry and the Association will each know exactly what they are talking about. That surely, is highly desirable.

WRA

4th International Mushroom Congress

The Conference had its teething trouble
With speakers travelling at the double.
" Such rallies, a decade ago unthinkable,"
Said Captain Atkins, the man unsinkable,
"Are fruits of ideas—master cards
Played by Drs. Bels and Edwards."
That England is mother of all Mushroom Sects
Because Nelson had said " England expects,"
Thus kinship-claiming did Denmark's Nielson try
With England's Nelson—ere he lost his eye,
And, when he quoted " Mushrooms cheaper than potatoes "
Many whispered " tariff treaties of the N.A.T.O.s."
" Interest the specialists, attract the cream "
Was Doctor Lambert's leading theme,
And, later, he dealt with spawn fertility
And met lively hecklers on ' genetic stability.'
Under rapt attention and no-one yawning
A paper was read on ' Shake-up Spawning '
By C. R. Rasmussen, a local resident,
The International Commission's new President;
By having the beds very well tossed
When spawn was halfway through compost,
He mentioned yields beyond believing—
Yields that he had been receiving.
Many heads sleepingly nodded
As into the depths the Scientists prodded,
Making it obvious some had no idea
Of technicalities on ' Twinned Basidia,'
But, only those with sleep ox-eyed
Missed the importance of carbon di-oxide
To bring pinheads to the surface racing
And, luckily induced by the act of casing.
On Cecids we learned some interesting facts—
The insecticide barrier one never neglects;
At one in ten thousand for B.H.C.,
Used thus in the casing, good it will be,
But, better still, to use it in compost
At under quarter rate and less be lost.
One Cecid in six weeks breeds hundreds of millions
And gill-nibbling Bacteria are riders on pillions.
Such interesting facts in lectures were rife,
And each foreign vistor had the time of his life.

F.P.

FANCY THAT!

According to the *Daily Herald* of 29th August, " Guiseppe Tentori's reputation as a writer and lecturer on mushrooms ended in a Lugano hospital—when he died from mushroom poisoning ".

Quoting one of the biggest mushroom growers in Ireland the *Irish Times* of 21st August, said, " I would say that production here has now reached its limit. It is mainly an export market of course, but the export market is not as firm as it used to be. This year prices have fallen about 20% on last year's prices and are now below 3/- per lb.".

The same article stated that mushroom exports for the first five months of this year totalled 4,197 cwt. against 10,280 cwt. for the whole of 1958.

COMPOST SALINITY AND CROPPING

By P. B. FLEGG

Glasshouse Crops Research Institute

The salinity or salt content of soils and composts is commonly measured in terms of their electrical conductivity under controlled conditions of water: solid ratio and temperature. For convenience the conductivity readings in millimhos are converted to a logarithmic scale in which increasing salinity is indicated by a decreasing *pC* value. Thus a *pC* value of 4.0 means a low salt content, a *pC* value of 3.0 means a medium level of salts, and any value below 2.5 shows that the salt concentration is high. Most green plants are extremely unhappy at *pC* values below about 2.7. Mushroom composts have been found to vary within the range of *pC* values 2.2—1.8 (2) and therefore have a very high soluble salt content indeed. As the greater proportion of the mycelium occurs in the compost it is of importance to discover to what extent compost salinity affects the growth of the mycelium and yield of mushrooms.

In pure culture experiments **Willam-Engels, Trzcinski** and **Willam** (4) found that increasing additions of potassium sulphate or potassium chloride to the medium progressively reduced mycelial growth, the chloride having a greater effect than the sulphate. **Treschow** (3) observed that in liquid culture there was a certain concentration of glucose above which no mycelial growth took place. At Littlehampton depressing effects on mycelial growth on agar media have been observed by the addition of sodium choloride, sodium sulphate and calcium chloride, particularly at levels exceeding 1%. Thus although more information on this aspect is desirable it is clear that mushroom mycelium is sensitive to increasing quantities of dissolved materials in the medium.

Investigation of the situation in the compost is rather more difficult for inevitably there will be some salts present, and to prepare a compost without them is impossible. However, there is some information from experiments in which the level of soluble salts already in the compost has been artificially increased. **Willam-Engels** *et al.* found that increasing additions of potassium chloride to the compost at the first turn seriously interfered with the composting process and the yield of mushrooms was progressively reduced. They, however, attributed the adverse effects to the effect of the chloride ion and not to increasing salinity.

At Littlehampton, the addition of two levels of either sodium sulphate or calcium nitrate to the compost immediately after peakheating has been found to reduce the level of productivity of the compost; both numbers of mushrooms and total yield were reduced to the same extent. Quite marked effects were evident at additions of salt equivalent to less than 20 pounds of salt per ton of compost. At these levels of addition the effect upon the *pC* value of the compost was not very great. This suggests that such additions of salt may well represent a variation in compost salinity which could easily occur under normal circumstances on any farm.

Throughout **Edwards'** work leading to the successful development of a synthetic compost it was found that, in general, organic sources of nitrogen such as dried blood and hoof and horn meal, were superior to inorganic sources such as nitro-chalk and ammonium sulphate (1). This may have been due to an adverse effect of the inorganic substances on compost salinity.

Apart from the level of soluble salts already in the compost at filling, decomposition of organic materials during cropping causes a rise in the salt concentration so that at the end of cropping the compost is relatively more salty than it was at filling. The effect of this on yield is not known, but it may well contribute to the lowering of productivity towards the end of the cropping period.

The main purpose of this article is therefore to draw attention to the following observations:—

1. Mushroom compost contains a high proportion of soluble salts (*pC* values range from 2.2. to 1.8).

2. Mushroom mycelium, in pure culture, is adversely affected by increasing levels of soluble salt in the medium.

3. Additions of salts to the compost have resulted in a marked reduction of productivity.

So far compost salinity has received scant attention from those investigating the composting process, and it may well be that unsuspected variations in the level of soluble salts in the compost contribute to some of the inconsistent results obtained. It would seem that the use of materials or methods of composting likely to lead to abnormally high levels of compost salinity should be avoided, or at least approached with due caution. The evidence suggests that this is an aspect of composts and the composting process which requires closer attention from both research workers and mushroom growers.

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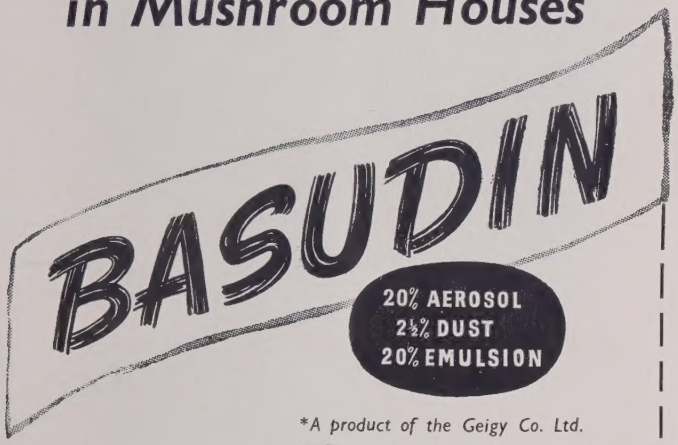

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SOME DUTCH COSTINGS

By **P. J. Bels & G. J. A. van Soest**

Mushroom growing has been on the upgrade in the Netherlands for some years. In 1947, there were only 30 growers and their number has now grown to about 470. The need for advice is very great among so many newcomers. The mushroom houses being used vary from very primitive premises to structures especially built for mushroom cultivation. Different growing systems are followed, viz., the one-zone system and the two or more zone system, the latter with separate rooms for peak heating, spawn running and production. The following calculation of costs concerns only growing on the one-zone system and is based on a farm of four mushroom houses, each of 200 sq. metres (2,200 sq. ft.). Three crops are grown annually in each house.

Typical Cropping Schedule

TABLE I

	Weeks
Outside:	
Fermentation of manure	1.5
Inside:	
Filling, peak heating, spawning	1
Spawn run till casing	2.5
Casing till cropping	2.5
Cropping	10
Emptying and disinfecting	1
TOTAL	17

One crop every 17 weeks gives $\frac{52}{17}$=3 crops per house per annum. For the farm in question this means 4 × 3 = 12 crops p.a. Annually an area of 4 × 200 × 3 = 2,400 sq. m. (= 26,400 sq. ft.) is under cultivation.

To arrive at the cost price of one kg. of mushrooms, three different yields, in kg. per sq. m., are analysed: viz. 5, 7 and 10 kg. per sq. m. (= 1, 1.4 and 2 lb. per sq. ft.). At the farm in question it means respectively:—12,000 kg., 16,800 kg., and 24,000 kg., p.a. (= 26, 400 lb., 36,900 lb. and 52,800 lb. p.a.). The average picking rate is in keeping with the number of kilograms. We will take this as follows:—

TABLE II

Picking Rates

Yield in kg./sq. in.	Picked in kilogram/ hours	Yield lb./ sq. ft.	Picked in lb./hours
5	5	1	11.0
7	6	1.4	13.2
10	8	2	17.6

The costs are divided into six groups, viz.:—

1. Overheads.
2. Operations prior to picking.
3. Labour during picking period.
4. Sale (including carriage and rent of baskets).
5. Auction costs.
6. Turnover tax.

Explanation of the method of calculating the costs.

As a basis for depreciation we took the replacement value. More emphasis is laid on obsolescence than on technical depreciation. Interest is regarded as 5% of the average of the original cost and the replacement value. Costs for maintenance are calculated on the expected life of the building. Working equipment is valued at ruling prices. The depth of the compost, together with the length of the picking period, influence the yield per sq. m., but in this article no attention is paid to this fact; in all cases we deal with the same amount of manure per sq. m.

The cost of labour is calculated according to the average Collective Labour Agreement (or Contract Indenture Agreement) on hourly wages and is increased by social insurance contributions. Picking wages are less than wages for the rest of the labour. Sales costs consist of cost of transport to the auction and rent for baskets, averaging 10 francs per kg. (= a little more than one penny a lb.). Auction costs are 5% of the average auction price. "Turnover tax" is another 5%.

Investment

Four mushroom houses with composting shed, but without peak heating room.

		f. (= about 2s) P.M. f (florin or guilder)	£ (approx.)
(*a*)	Land (0.25 acre)		
(*b*)	building costs (4 houses plus composting shed)	30,000	3,000
(*c*)	shelf beds (zinc, steel and wood)	10,000	1,000
(*d*)	heating installation	8,000	800
(*e*)	electricity installation	2,000	200
(*f*)	water supply	2,000	200
(*g*)	manure turner	1,500	150
(*h*)	small implements	500	50
(*i*)	miscellaneous items which depreciate	1,000	100
	Invested capital	55,000	5,500

1. Annual Overheads for the Organisation of the Holding

		f	£
(*a*)	Cost for the land	100	10
	Depreciation rates:		
(*b*)	building costs 5% (of f30,000—f5,000)	1,250	125
(*c*)	shelves 10%	1,000	100
(*d*)	heating installation 5%	400	40
(*e*)	electricity installation 5%	100	10
(*f*)	water supply 5%	100	10
(*g*)	manure turner 10%	150	15
(*h*)	small implements (replacements)	100	10
(*i*)	miscellaneous 10%	100	10
(*j*)	interest on capital 5% (f55,000 + f5,000)÷2	1,500	150
(*k*)	insurance	100	10
(*l*)	maintenance or repairs (average)	500	50
	TOTAL	5,400	540

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2. Annual cost of operations prior to picking

At three crops p.a. per house; compost 13-15 cm. (=5-6″) deep.

	f	£
(*a*) Manure, 12 tons per house per crop $3\times4\times12=144$ tons at f4,500=(£4 10s. 0d.)	6,480	648
(*b*) spawn $3\times4\times40\times$f4=(8s)	1,920	192
(*c*) casing soil 85 cu. m. (3,148 cu. ft.)	800	80
(*d*) electricity and water	600	60
(*e*) fuel	1,500	150
(*f*) fungicides/insecticides	300	30
(*g*) gypsum, fertilizers	250	25
(*h*) labour (except picking) 3,600 hours at f2/hr=(4s)	7,200	720
(*i*) miscellaneous	200	20
(*j*) interest on costs	100	10
	19,350	1,935

3. Annual cost of labour for picking and trashing

(See Table II)

	f	£
With yield of 12,000 kg. : 5 kg./h= (11 lb./h) .. 2,400 hours at f1·50=(3s)	3,600	360
With yield of 16,800 kg. ; 6 kg./h= (13.2 lb./h) 2,800 hours at f1·50=(3s)	4,200	420
With yield 24,000 kg. : 8 kg./h=(17.6 lb./h) 3,000 hours at f1·50=(3s)	4,500	450

4. Sales cost

Freight plus rent of baskets at f0·10 per kg. (a little more than 1d. a lb.) is respectively f1,200=(£120) f1,680=(£168) and f2,400=(£240).

5. Auction cost

5% from the mean auction price of f3=(6s) is f0·15 per kg.=(1.7d.—about $1\frac{3}{4}$d. a lb.).

6. Turnover Tax

5% from the mean auction price at f3=(6s) is f0·15 per kg.=(1.7d. a lb. or about $1\frac{3}{4}$d.).

TABLE III

Comparative survey of the cost price at an auction price of f3 per kg.=(2s. 8d. per lb.).

Description	Yields of:	1 lb./sq. ft. total 26.400 lb.	1.4 lb./sq. ft. total 36,960 lb.	2 lb./sq. ft. total 52,800 lb.
Cost				
1. Organisation of the holding		£540	£540	£540
2. Operations till picking		£1,935	£1,935	£1,935
3. Picking and trashing labour		£360	£420	£450
	TOTAL	£2,835	£2,895	£2,925
	per lb.	2s. $1\frac{1}{2}$d.	1s. 7d.	1s. $1\frac{1}{2}$d.
4. Sales costs		1d.	1d.	1d.
5. Auction costs		$1\frac{1}{2}$d.	$1\frac{1}{2}$d.	$1\frac{1}{2}$d.
6. Turnover tax		$1\frac{1}{2}$d.	$1\frac{1}{2}$d.	$1\frac{1}{2}$d.
Cost price per lb.		2s. $5\frac{1}{2}$d.	1s. 11d.	1s. $5\frac{1}{2}$d.

TABLE IV

Calculation of the difference between revenue and costs (exclusively the reward for management and supervision).

Description	Yields of:	1 lb./sq. ft. total 26,400 lb.	1.4 lb./sq. ft. total 36,960 lb.	2 lb./sq. ft. total 52,800 lb.
Production and sales costs		£3,320	£3,570	£3,880
Value of mushrooms at sales price of f3=(2s. 8d./lb.)		£3,520	£4,928	£7,240
Difference between revenue and costs (excl. reward for management and supervision)		£200	£1,358	£3,160
Profit		6%	38%	81%
Production and sales costs		£3,290	£3,520	£3,820
Value of mushrooms at sales price of f2.75=(2s. 5½d./lb.)		£3,245	£4,543	£6,490
Difference between revenue and costs (excl. reward for management and supervision)		£45	£1,023	£2,670
Profit		1.4%	29%	70%
Production and sales costs		£3,260	£3,480	£3,760
Value of mushrooms at sales price of f2.5=(2s. 4d./lb.)		£3,000	£4,200	£6,000
Difference between revenue and costs (excl. reward for management and supervision)		−£260	£720	£2,240
Profit		(Loss) 8%	21%	60%
Production and sales costs		£3,230	£3,440	£3,700
Value of mushrooms at sales price of f2.25=(2s./lb.)		£2,700	£3,780	£5,400
Difference between revenue and costs (excl. reward for management and supervision)		£530	£340	£1,700
Profit		(Loss) 17%	10%	46%
Production and sales costs		£3,200	£3,400	£3 640
Value of mushrooms at sales price of f2.0=(1s. 9½d./lb.)		£2,400	£3,360	£4,800
Difference between revenue and costs (excl. reward for management and supervision)		£800	£40	£1,160
Profit		(Loss) 25%	(Loss) 1%	33%

Amounts are rounded off to nearest £10.

Differences in % with Dutch figures are due to the fact that we took £1 = f10 (instead of f10.5)

The figures of Table III give an impression of the cost price.

In Table IV the difference between revenue and costs (exclusive reward for management and supervision) are given for various sales prices.

This difference is also expressed as a percentage of the total costs.

The latter is called profitableness. Table V gives an outline of the profit.

TABLE V

Outline of Profit

Sales Price		Yields		
		5 kg. sq. meter	7 kg. sq. meter	10 kg./sq. meter
per kg.	per lb.	1 lb./sq. ft.	1.4 lb./sq. ft.	2 lb./sq. ft.
f3.00	2s. 8d.	6%	38%	81%
f2.75	2s. 5½d.	1.4%	29%	70%
f2.50	2s. 4d.	−8%	21%	60%
f2.25	2s. 0d.	−17%	10%	46%
f2.00	1s. 9½d.	−25%	−1%	33%

Table V shows that a yield of 5 kg./sq. meter (1 lb./sq. ft.) is very hazardous. The grower is just on the borderline between gaining and losing. With 7 kg./sq. meter (1.4 lb./sq. ft.) he is in a better position and with 10 kg./sq. meter (2 lb./sq. ft.) the grower still makes a good profit even when getting the lowest price.

In England experience shows that growers who do not get more than 5 kg./sq. meter (1 lb./sq. ft.) stop growing after some time. (Questionnaire *MGA Bulletin*, Feb./1958).

In Canada in 1952-1956 the line between gaining and losing was at 7 to 8 kg./sq. meter (1.4 to 1.6 lb./sq. ft.). What is this limit in the Netherlands?

In 1957, the average price was about f3.0 per kilo (2s. 8d. per lb.) and the average yield was 4½ kg./sq. meter (0.9 lb./sq. ft.). Profit for that year was about 6%. Even a grower with low yields made a profit. In 1958, things were different. Various sales problems make it difficult to give the correct figures. The following figures will not be far wrong, however:—

Mean Price—f2.25 to f2.50/kg. = (2s. to 2s. 4d./lb.).
Yields from about 5-6 kg./sq. meter (1-1.2 lb./sq. ft.).

Profitability varies from grower to grower and from farm to farm, between about plus and minus 10%. One third of the growers make a profit, one third lose money and one third finish up level. About 90% of the mushroom cultivation in Holland is family enterprise. Even when little or no profit is made, father and elder children earn a living from their mushroom farm.

Table V shows clearly that mushroom growing in Holland does not bring wealth, but rather the opposite.

Increased profit can be achieved in two ways, viz.:—

(*a*) Higher yields (more lb./sq. ft.). It is the Research Station's responsibility to promote the higher yields to be obtained.

(*b*) Reasonable prices, as stable as possible. Growers' association and sales organisations have to aim at this.

The Research Station and the other organisations concerned are finding it a hard but thankful task here in the Netherlands; but during difficult times, all must be alert in their respective fields.

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If you use Racing Stable manure, or other manure in which excess straw is present, the use of Adco "M" is strongly advised. The fermentation of this type of manure takes place more rapidly and effectively when Adco "M" is added. You get a more thorough breakdown of the strawy material, which then becomes available as food for the growing spawn. So your compost provides more nourishment for the mushrooms, and you get a bigger crop.

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Adco "M" produces a good quality compost of even texture. It provides an ideal medium for spawn run and helps to avoid greasy conditions, lack of aeration, and over wet compost – all of which delay mycelium growth. The spawn is able to make more rapid use of the food provided. It establishes itself more quickly and this is again a great help in preventing diseases and weed fungi. The faster the spawn grows and fills the compost the less likelihood is there of disease and weed fungi becoming serious competitors. A quick spawn growth also gives a quicker ultimate production.

You can have freedom from uncertainty in the composting process – by using Adco "M". It will pay you hands down. Adco "M" is specially formulated as a result of years of experiment, for the specific purpose of making mushroom compost. It can be used for composting with straw alone, if you wish. Or it can be used to compensate for variations in the quality and texture of your manure supply. Adco "M" provides the way to better mushroom compost every time.

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Please send me your leaflet giving full details of Adco "M".

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WORLD'S PRESS DIGEST

Mushrooms continue to be too plentiful for the demand, *Nurseryman Seedsman*, 6th August, 1959. Mushroom trade remains steady with preference for quality cups and buttons, *Fruit Trades' Journal*, 15th August, 1959. Mushrooms on a market glutted with almost every produce, are doing exceptionally well. The reason is thought to be the restricted supplies being produced by growers during this usually bad selling period *Grower*, 22nd August, 1959. Mushrooms have slowed down, *Grower*, 29th August, 1959. There is an easier inquiry for open samples *Fruit Trades' Journal*, 29th August, 1959.

At times I am bewildered at the attitude of some growers—and good growers too—at their apparent lack of interest in their mushrooms after they leave the farm. They will produce crops of excellent mushrooms of which they are justly proud. Then suddenly the interest flags. The crop is then maltreated, rough handled and poorly graded into unlined baskets which are often handled carelessly.

Robert Patterson in *Commercial Grower*, 28th August, 1959.

On the whole harvesting has proceeded at top speed, with Sunday combine work nothing unusual, and with breakdowns relatively light, a contributory factor in this favourable running being the shortness of a good deal of the straw and freedom from weedy growth—a vivid contrast to conditions a year ago.

Farm Implement and Machinery Review, 1st September, 1959.

The essential aims of the fully-automatic " Guernseyman " loco-type steam sterilizing boiler unit are economical and reliable running, cleanliness, labour saving (no stoker required) and the supply of a constant head of dry steam. Designed by John Upham Ltd., of Guernsey, the unit consists of a Guernseyman boiler, rated at 1,760 lb., evaporative capacity at 50 lb. pressure, fired by a Nu-Way 200 secs. oil burner, complete with a Guernseyman oil pre-heater, designed for electricity economy. *Commercial Grower*, 28th August, 1959.

The area down to mushrooms in glasshouses at 15th January, was 36 acres, compared with 37 acres the previous year.

Ministry of Agriculture Census, 1959.

There is nothing to be gained, and perhaps some disadvantage in applying the casing layer before there is a good penetration of mycelium.
F. W. Allerton in one of a series of articles in *Nurseryman Seedsman*, 20th August, 1959.

We note with regret the retirement of Mr. Fred. Atkins, who has been the promoter of the International Commission he has directed with such influence over the past ten years. He must be proud of the results of his work, which he has seen expand at each successive congress. It is particularly pleasing to me to pay this public tribute to him, for I regret that the French mushroom growers have not yet been able, despite every effort, and for reasons unknown to us, to accord him the distinction which our Minister of Agriculture wishes to bestow.
R. Chaumette, in *Bulletin of the French Federation*, July-August, 1959.

It has to be remembered that many of the modern trends in farming have been enforced by economics. The demand for high output regardless of other considerations, has even spread to vegetables and fruit. It is important to fight this battle of quality now.

R. H. Holmes in *Daily Telegraph*, 19th August, 1959.

High temperatures have over-heated trays and beds, and many crops have petered out on the first and second flushes. Springtails and flies have also done considerable damage.

Cheshire Correspondent, in *Grower*, 22nd August, 1959.

A pre-treatment for the preparation of corroded metal surfaces prior to painting is " formula E " external metal treatment, made by the Plus-Gas Co. Ltd., 1-11 Hay Hill, London, W.1. Claimed to be non-acid and non-corrosive, it is designed to combine with the oxides on the metal surface to form an insoluble corrosion resisting film.

Commercial Grower, 14th August, 1959.

The future control of some of the pests of mushrooms might be by a " Pied Piper " approach, where, within a suitable insect-proof and screened mushroom house, some zone could temporarily be made attractive to the resident pests, always providing that some suitable spray or dust was then brought into the scheme of things.

Martin D. Austin, in *Commercial Grower*, 14th August, 1959.

A study, by Dr. Lilian E. Hawker, at Bristol University, of the structure and development of *Diehliomyces microsporus* (Diehl and Lambert) Gilkey from mushroom beds, showed that the apparent folding of the ascogenous mass is due to splitting through tension set up by unequal growth, no true folding occurring. This observation supports the transfer of this fungus from the Tuberales to the Eurotiales.

Review of Applied Mycology, August, 1959.

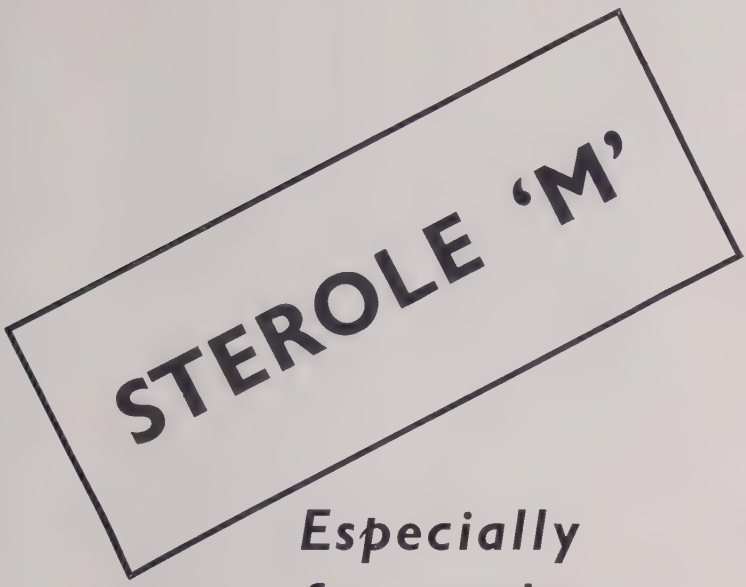
An insecticidal paint known as Lakil, is effective for at least two years, and resists heat, steam and condensation. It is made by J. Manger and Son Ltd., of London, E.8.

Industrial Equipment News, mid-August, 1959.

A new method of preserving has been conceived by Dr. Harold Meryman, biophysicist at the Naval Medical Research Institute in Bethesda, Maryland. He has been " freeze-drying " mice, birds, snakes, frogs, bugs, mushrooms and other things, for several days. A display at the American Museum of National History is a " freeze-dried " mushroom which " could not have been preserved in any other way ".

Daily Telegraph, 28th August, 1959.

Paper sacks, suspended from metal frames, are being used as expendable dustbins by 50 municipalities in Sweden. It is possible that the paper dustbin may appear in the U.K. before long; a British manufacturer is reported to be interested in promoting the idea. The paper containers are more hygienic than metal bins; rotting garbage clinging to the inside of a bin becomes a permanent breeding ground for bacteria and flies. *Packaging News*, July-August, 1959.



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One, a shelf grower who on successive crops picked in excess of 3,000 lbs. off of 1,500 feet in the remarkably short picking time of 3 weeks 6 days.

The other, a tray grower using a shallow tray with not more than 4" of compost is cropping 390 lbs. of mushrooms to the ton (8 cubic yards) of manure. Both have one thing in common. Excellent crops, excellent quality and of course

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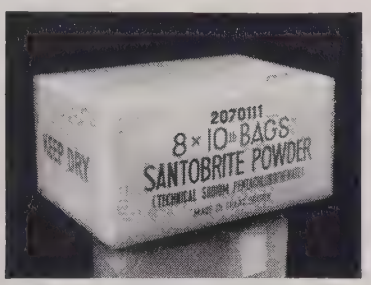

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SOME GROWING HOUSE ESSENTIALS

By BRIAN HARPER*

During the hot summer in Copenhagen I did not see any mushrooms for sale in the shops, so I asked one grower why and was told that in the hot summer they do not grow many mushrooms because the houses get too hot and cannot be cooled in the night.

This indicates just two essentials in the design of growing houses. Keep the cool atmosphere within from escaping and allow for quick response to temperature changes.

In winter, of course they do not arise but if provided for, will keep the heat from escaping. It would seem that houses should be designed for summer growing.

There are two means by which the required atmosphere inside can escape--by leaking (as in the case of excessive top and bottom ventilation) and by thermal transmittance.

The way to prevent leaking is the well-known vapour barrier, and thermal transmittance by thermal insulation, the one being no good without the other, as, except in the case of cork, an insulation without vapour barrier would allow a dampening of the insulation and serious and constant loss of efficiency.

In choosing vapour barrier thermal insulation materials, the very first consideration must be for the purpose to which the building is to be put. In considering growing rooms, the condition of quick response to temperature change must be provided and therefore the vapour barrier and insulation must be of the lowest density.

As the vapour barrier is leak proof, a material which can be so joined should be used and the obvious choice is Polythene or P.V.C., both of which can be welded. Polythene is cheaper; P.V.C., tougher; but either will need protecting on the inside, and for this purpose $\frac{3}{16}$" thick Asbestolux is the best material because there is no condensation, it is inert and will absorb a lot of fungicide if the grower's habit is to spray his houses.

In considering the insulation material, it should be remembered that this will be now kept dry from the inside of the house, but can get damp from the outside. This could be prevented be enveloping the whole in Polythene, but this is not very practicable and certainly quite expensive. It is better to keep the insulation as dry as possible by airing, using a cavity between it and the outside cladding and having it very well ventilated.

The cavity, of course, can be anything more than say 2", therefore the outside cladding need not conform to the shape of the inside of the house. A rectangular section house can be constructed inside a curved asbestos shed, which would take the place of the cladding. So the only considerations in choosing the outside cladding are economy, durability and appearance. Corrugated iron is the least costly, and painted white would be very good.

* Mr. Harper is a Builder as well as a Mushroom Grower.

Before deciding upon the roof, consideration should be given to the inside cross section.

Much has been thought regarding air movement in growing rooms in order, probably, to decide how many air changes are really necessary. Both matters are only economically achieved if the minimum of air is involved. Therefore the shape or cross section of the inside should provide this by having a flat ceiling as low as practicable and the width should provide the minimum width gangways.

It has been found in a house 14 ft. wide and 6 ft. 6 inches high containing 30 sq. ft., of bed per foot run that the air can be moved sufficiently by a 9 inch diameter 25 watt fan and Polythene tube with 1 inch square holes every 2 ft., and laid along one of the two 2 ft. 6 inch wide passages, holes facing upwards. The house is 45 ft., long.

If 2 ft., wide trays are used, 14 ft., is wide enough and the simplest roof is flat with vapour barrier, fibre glass, cavity, boards and bitumen built up covering finished with white spa aggregate.

The floor must be concrete and there seems little point in insulation here as heat rises, besides which we want a damp floor to help maintain humidity. There is an illustration in reverse to be seen in those open top deep freeze conserver cabinets in some food shops. If, in the unlikely circumstances of a floor absorbing too much heat in summer, it can be sprayed with water, and the evaporation will cool it.

A house constructed along the lines indicated was peak heated and held 140° F.—145° F. for 2 days and cooled slowly for 4 days while snow remained on the flat roof. One interesting point was noticed in that there was a circle about 8 inches diameter where the snow had melted, indicating a puncture in the Polythene vapour barrier.

During this hot summer, the highest late afternoon temperature noticed at the top of the house was 68° F. This cooled to 62° F. by morning, with no mechanical ventilation. The average day temperature in this house during our heatwaves has been 60° F. to 65° F. The night cooling will be more efficient when four extractor fans are used.

BOLETUS EDULIS CASE ECHO

An echo of the Chichester Case where a firm of soup powder manufacturers were charged with misrepresentation in describing soup powder as "mushroom soup powder" whereas it was admittedly made from a toadstool, *boletus edulus*, but which, the Magistrates held, was correctly described, is contained in the news that West Sussex County Council's Weights and Measures Committee, who launched the initial prosecution, have withdrawn summonses against three food firms, summonses which were adjourned, *sine die*, after the Chichester case when 100 gns. costs were awarded against the County Council.

The Committee now state that the firms concerned have been informed and they, for their part, have agreed to alter the wording and the design of the soup powder packets.

The CULVERWELL Manure Turner

FOR MUSHROOM GROWERS

PETROL *or* ELECTRIC

EXTREMELY MOBILE

£225
Ex Works

The small machine with the BIG turnover

Bruises and aerates–does not shred. CAN BE USED FOR ALL TURNINGS. 3 men handle 25/50 tons per day. Waters as it turns. Stacks up to 5 feet. By using the CULVERWELL MANURE TURNER throughout the whole composting process, the work is reduced to the minimum, time taken is shorter with improved results.

Will pass through a door 2' 10" × 5' 10" with the detachable wheels removed

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THE UGLY PINHEAD

With Apologies to Hans Christian Andersen

It was so lovely out in the country—summer had come! The stork was strutting about on his long red legs, jabbering Egyptian, for that was the language his mother had taught him.

Bathed in sunshine stood an old manor house and over in the corner were the stables. Here, many pretty horses were lined up—their names were either royal or fancy: ' Elizabeth II ', ' King Frederik the IX ', ' Gina Lollobrigida ' and ' Black and White '.

Two boys came into the stable—they did not look at the beautiful horses at all—they went right behind, then looked into the straw letter. " I am sure that they don't do any horse racing ", said a good looking brunette horse called 'Marilyn'. " No ", said ' Jimmy the Great', " they belong to the gang of people they call Mushroom Growers—it is a widespread group of funny people devoting their interest to our droppings. I am sure they are quite dangerous—they stick together like members of a clan. Somebody told me that this movement is even stronger than the Communist Party and the real reason for Tovaritch Khruschev not coming to Denmark is that he feels that what they call *Psalliotism* has spawned right through the very soul of people in the western world ". " Well it might be as good an explanation as all the others", said a sceptical horse called 'Cherry Brandy'.

The mushroom grower came and collected all the droppings and they were steaming like freshly boiled potatoes when they brought them to a mushroom farm. Here the droppings and the straw were mixed in a machine. It offended the royal droppings to be mixed with the ones from the heavy brewery horses, but in the days of democracy you have to get used to this mingling.

" Now we are ' compost ' ", was heard from the manure pile. " We are a scientific product!" " Yes ", went on the voice, " and here comes a short fellow with a moustache and brown glasses to put his nose right into our body ". " Everyone calls him Atkins and I believe they also called him President." " No ", said another voice from within, " I had the honour of being close to the President—it was a nearly bald-headed energetic young man standing here pouring cold water right into my body—not a trace of gin or whisky was in it. He maybe, was the new President ".

" Yes ", said the thermophile society of germs in the heap—" but here are lots of fine people around ". " Haven't you seen the tall Professor Paludan?—he is a gay fellow." "And did you see the charming Madame Blondeau from France?"—said a bunch of hot firefang in the corner.

Well, so many people came into the glasshouse-compost room that it was impossible to hear any more of what was said about foreign guests, but manure germs are not always so polite, even if they are of Danish heredity. The manure heap lost all its personality. It became

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Graded especially for mushroom Casing it is protected from contamination by exclusive double wrapping of waxed paper and hessian. 7½ cubic ft. bales (18 bushels before pressing) are sold by capacity to ensure you pay only for peat, not moisture.

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VISIT OUR STAND AT THE MUSHROOM GROWERS EXHIBITION FOLKESTONE

a cocktail—dried blood, lime and superphosphate were mixed into it—but nobody knows the ultimate result of a cocktail! The hot period came to an end. Composting and peak heating blew out the life and the dead compost cooled down.

A young girl came into the house where the compost filled the trays and asked, " Where shall I plant the ' Sobexas ' and where the ' Sinden spawn ' "? " We will place them close to each other, so we can see which is the best ", said the boss, Riber Rasmussen by name.

So the two strains crept into the compost, spread out and were looking forward to a quiet life—but no. Riber Rasmussen came and with his fingers " shook us up " like an ocean in storm. " He is damn foolish ", said the boxes which were not shaken up, " he will kill you—he is a spawn murderer !" . . . Well that was the general belief—but after a few days the boxes recovered.

A heavy discussion arose. The boxes with the different varieties started a yakkety, yakkety, yak and it was not possible to hear any more. Riber Rasmussen would not listen to this noise and he covered the whole lot of boxes with meadow soil, and the room seemed quiet. In a few days tiny spots appeared on the soil surface and they grew into funny shaped things, which the scientist calls Sporophores. A discussion started again. A forerunner in the tray where Riber Rasmussen did not place his greasy hands, was a big clumsy mushroom who said, " That's what I told you kids over there, yes, you in the shake-up trays. You will stay in your tiny size, you will die as pinheads. You are so ugly that even the Phorid flies will not put their body into you "!

The tiny pinheads said nothing, for they remembered that very morning a charming old gentleman called Dr. Lambert, right from the heart of Beltsville, had looked at them and expressed his thoughts: " I think this will be a fine crop "—so they kept up their hope. Early the next morning a group of people came into the mushroom house, all wearing Congress badges. " What a crop ", said an American. " It's worth a million dollars !", he added. " Wat een cultur ", said the Dutchman, and " Mein Gott—welche Ernte ", said the German, to which a charming French girl added, " Tres bien ". All the mushrooms closed bashful eyes.

It was then that the whole lot of mushrooms started to sing " Wonderful, Wonderful Copenhagen " in honour of the guests. Finally, the smartest of the Sporophores said loudly, " Never did we dream of such happiness when we started our life as droppings and even yesterday as pinheads ". " Long live the mushroom scientist !", they shouted.

This story comes straight from the new edition of Hans Christian Andersen's fairy tales, and if you do not believe me, go and get the new edition in the bookstore!

ASGER KLOUGART, Denmark.
(4th International Mushroom Congress).

WHEN ONLY THE BEST IS GOOD ENOUGH

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Most growers have tried various methods for fly control which include dusts, sprays, smokes and atomisers.

There is on the market the Vulcan-O fumigator, consisting of a bulb or series of bulbs, into which tablets of highly concentrated Gammexane can be inserted through two holes in each bulb, which is then plugged into the electric-light circuit.

When switched on, the tablets are vaporised by the warmth of the current and this vapour penetrates every part of the house. The operation is very simple and quick. I have found it most effective and labour-saving and it has absolutely no harmful effect on the mushrooms. The fumigator can be moved from house to house, the only further expenditure being for the extra Vulcasan-O insecticidal tablets needed.

One fumigator adequately deals with an area of 1,500 cu. ft. and for larger houses, the appropriate number of bulbs have been used simultaneously.

It is made by Vulcan Fumigator Company Limited, 3 New London Street, London, E.C.3.

R. Duthy,
(Little Horkesley, Essex.)

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PUBLICITY

The response by MGA Grower Members to the appeal for larger publicity contributions can only be described as magnificent, for over £7,000 has so far been contributed to the fund since 1st November, 1958. Of this figure more than £6,000 has been contributed by the growers themselves and has been collected through the good offices of the various spawn manufacturers and distributors.

It is well worth noting that, for the year ended 31st October, 1955, £1,573 was collected. The following year the figure was £2,761 and in 1957, a total of £4,494 was reached and this was raised, with the carton contribution remaining the same, to £4,770 in 1958.

WHERE THE MONEY GOES

Direct Advertising. This year the MGA decided on a bold publicity experiment—Television advertising from the A.T.V. Studios at Birmingham, a centre served by a wide circle of growers. It was no doubt unfortunate that this television campaign coincided with the warmest and most prolonged spell of hot weather for many years and the sunniest summer since 1911. During the campaign surveys amongst greengrocers in the area were carried out and the final survey results have not yet been assessed. Until such time as these results are available the over-all result of the campaign cannot be reliably gauged but a full report will appear in *The Bulletin* in due course.

Each month throughout the year a display advertisement has appeared in " *Home Economics* ", a publication with a high circulation amongst those people who teach the rest of the population how to cook—through schools and elsewhere. As a direct result of this advertisement over 1,000 requests have been received for the special recipe leaflet prepared for this campaign and each leaflet has been accompanied by an information sheet.

Public Relations. The Association has its own Public Relations Officer and the many contacts made during the time when Mr. Guy Reed was responsible for this work have, by and large, been maintained and many thousands of general recipes have been distributed. Over the past year nearly 2,000 " mentions " of mushrooms, representing about 6,000 column inches, have appeared in the National and Magazine Press. All of these cannot be directly traced to the efforts of the MGA in this direction, but it seems fair to assume that a great proportion do appear as a result of the MGA's Public Relations work. Contact is also maintained with the television and sound radio authorities and only last month, as a result of a " contact ", the " No need to peel " angle was put over during a B.B.C. sound broadcast.

" Mushroom Weeks " and similar publicity efforts have been carried out in various centres including Edinburgh, Glasgow, Leeds, Leicester, Bristol, Hanley (Stoke), Liverpool, Manchester, London and so on. Mushrooms were " on " at the Ideal Homes Exhibition in Bradford and in Bristol, they appeared on the NFU Produce Show Society Stand at Chelsea and, early in September at Birmingham. For a whole week there were mushroom cooking demonstrations in Edinburgh and at

Luton, at a special two day demonstration, the MGA had its own stand. Those special MGA "Mushroom Aprons" are still going strong and some have been given away as prizes in an MGA Quiz competition for which entries have been received from many parts.

Recipe Library. A special Recipe Library has now been established with 100 primary recipes as the basis. These have been sectionalised and can now more easily be supplied to the Press, etc.

Picture Library. Requests are frequently received for pictures of mushrooms, cooked and fresh, to accompany various press articles and such a library has now been established and is being added to. Six special mushroom colour plates will appear in a book about to be published, and written by Marguerite Patten, the well-known T.V. cook.

Paper Bags. Since the Paper Bag Scheme was started approximately twenty million bags have been sold and sales average about three quarters of a million a month. This average figure will no doubt now be increased as two additional firms, one in the Midlands, are now manufacturing and distributing these bags.

Future Plans. At the moment these are only in the Committee stage but it is planned, in 1960, to make a special drive with point-of-sale material in the various shops. In this connection it is as well to remember that, throughout the country there are 27,000 retail greengrocers and that postage alone, allowing 6d. per head, would cost £675! It is estimated that the cost of addressing labels for the 27,000 would amount to a further £81—all this without the cost of the actual point-of-sale material! Future publicity plans will be the subject of a Special *Bulletin* article, later this year.

1959 PUBLICITY FUND CONTRIBUTORS

	£	s.	d.
Dan Wuille & Co. Ltd., Covent Garden Market, W.C.2.	100	0	0
Francis Nicholls Ltd., Smithfield Market, Birmingham	157	10	0
R. E. Jenkinson Ltd., Covent Garden Market, W.C.2	105	0	0
Wm. Morgan & Co. Ltd., Salesmen, Custom House Street, Cardiff . .	10	10	0
Ernest White Ltd., Salesmen, Kirkgate Market, Leeds	5	0	0
C. W. Tooley & Son Ltd., Salesmen, Nottingham	2	2	0
Geo. Jackson & Co. Ltd., Smithfield Market, Birmingham	50	0	0
Ed. H. Lewis & Sons Ltd., Covent Garden Market, W.C.2	5	5	0
Wm. McGrattan & Sons Ltd., Smithfield Market, Manchester . .	5	5	0
G. W. Jackson (Cardiff) Ltd., 11 Custom House Street, Cardiff . .	10	10	0
C. Snowdon & Co. Ltd., Castlefolds Market, Sheffield	12	10	6
E. Broadbelt Ltd., Smithfield Market, Manchester	15	15	0
Dan Wuille Ltd., 79 Candleriggs, Glasgow C.1	25	0	0
T. J. Poupart Ltd., Covent Garden, London, W.C.	115	0	0
Reuben Levy Ltd., 88 Spitalfields Market, London, S.E.1	5	13	8
Jackson & Lakin Ltd., Nottingham	3	3	8
Sundriesmen:—			
Bradford Fertilizer Co. Ltd., Whitefield Place, Girlington, Bradford	10	10	0
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S. A. F. Sampson Ltd., Oving, Chichester, Sussex.			
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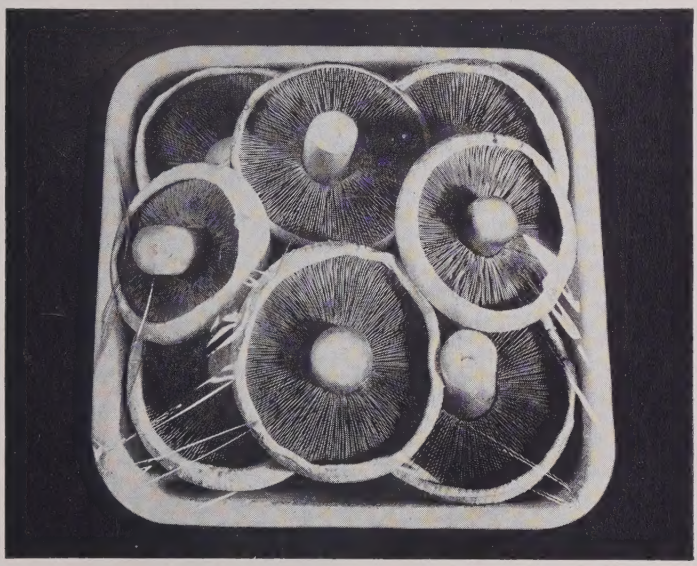

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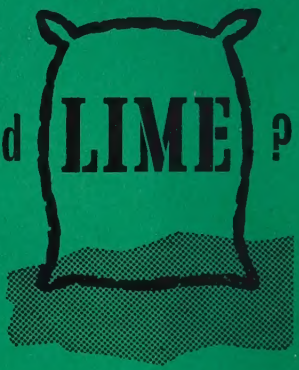

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